

Claims Listing

Claims 1-25 (Cancelled).

26. (Previously Amended) An optical imaging device, in particular an objective for carrying out semiconductor microlithography at an extreme ultra-violet wavelength, said device comprising:

a plurality of optical elements disposed in a beam path for a beam of extreme ultra-violet light;

a plurality of diaphragms each of which has a respective diaphragm opening of a fixed geometry, said fixed geometry of said diaphragm openings being different in different respective ones of said diaphragms and,

a diaphragm device for storing said diaphragms in a diaphragm store and selectively exchanging diaphragms between said diaphragm store and an operating position, said diaphragm openings of said diaphragms present in said diaphragm store being located out of the beam path, the said diaphragm opening of a said diaphragm present in said operating position being located in the beam path, whereby the objective can be selectively stopped down according to the said fixed geometry of the said diaphragm opening of any one of said diaphragms from said diaphragm store which is selectively introduced into said operating position.

27. (Previously Amended) An optical imaging device according to claim 26, wherein said diaphragm store comprises a revolving disc diaphragm stack and said plurality of diaphragms comprises a plurality of individual revolving disc diaphragms which are provided with said diaphragm openings.

28. (Previously Amended) An optical imaging device according to claim 27, wherein said optical imaging device further comprises a housing within which said optical elements are located and, said revolving disc diaphragm stack is located outside of said housing.

29. (Previously Amended) An optical imaging device according to claim 27, wherein said diaphragm store further comprises a plurality of separate plug-in units and individual ones of said revolving disc diaphragms are stored in said revolving disc diaphragm stack in respective individual ones of said separate plug-in units.

30. (Previously Amended) An optical imaging device according to claim 27, wherein said housing includes an opening through which said diaphragms are exchanged between said diaphragm store and said operating position said revolving disc diaphragm stack is displaceable relative to said opening in said housing for positioning any selected one of said revolving disc diaphragms for introduction into said operating position by way of said opening.

31. (Previously Amended) An optical imaging device according to claim 29, wherein said diaphragm device further comprises a feeder device which removes a said revolving disc diaphragm from a said separate plug-in unit of said revolving disc diaphragm stack, introduces said revolving disc diaphragm into the beam path, and re-deposits said revolving disc diaphragm in said revolving disc diaphragm stack after said revolving disc diaphragm has been used in said operating position.

32. (Previously Amended) An optical imaging device according to claim 31, wherein said feeder device comprises a moveable robot gripper arm.

33. (Withdrawn-Currently Amended) [Optical] An optical imaging device according to [[Claim]] claim 27, wherein said diaphragm device has a lifting device for positioning said revolving disc diaphragm in the beam path.

34. (Previously Amended) An optical imaging device according to claim 27, wherein said diaphragm device has a holding device for fixing said revolving disc diaphragm in the beam path.

35. (Withdrawn-Currently Amended) [Optical] An optical imaging device according to [[Claim]] claim 27, wherein one of said optical elements has a holding device for fixing said revolving disc diaphragm in the beam path.

36. (Previously Amended) An optical imaging device according to claim 27, wherein said diaphragm device has a lifting device which is provided with, a holding device for fixing said revolving disc diaphragm in the beam path.

37. (Withdrawn-Currently Amended) [Optical] An optical imaging device according to [[Claim]] claim 34, wherein said lifting device is pressed against said holding device by spring elements for the purpose of dynamically decoupling said revolving disc diaphragm from said optical imaging device.

38. (Withdrawn-Currently Amended) [Optical] An optical imaging device according to [[Claim]] claim 34, wherein for the purpose of dynamically decoupling said revolving disc diaphragm from said optical imaging device, said revolving disc diaphragm can be fixed on said holding device via magnetic forces.

39. (Withdrawn-Currently Amended) [Optical] An optical imaging device according to [[Claim]] claim 33, wherein said lifting device is dynamically decoupled.

40. (Previously Amended) An optical imaging device according to claim 27, further comprising a housing within which said optical elements are located, said housing having an opening through which said revolving disc diaphragms are introduced into the beam path.

41. (Previously Amended) An optical imaging device according to claim 26, wherein said diaphragm device is dynamically decoupled.

42. (Previously Amended) An optical imaging device according to claim 32, wherein said diaphragm device has a lifting device for positioning said revolving disc

diaphragm in the beam path and wherein said lifting device picks up said revolving disc diaphragm from said robot gripper arm.

43. (Previously Amended) An optical imaging device according to claim 32, wherein said lifting device moves said revolving disc diaphragm according to a rocking steering movement.

44. (Withdrawn-Currently Amended) [Optical] An optical imaging device according to [[Claim]] claim 33, wherein said lifting device is designed as a set of scales, in particular with a parallelogram guide.

45. (Withdrawn-Currently Amended) [Optical] An optical imaging device according to [[Claim]] claim 33, wherein said lifting device is of pantographic design, in particular having solid joints.

46. (Withdrawn-Currently Amended) [Optical] An optical imaging device according to [[Claim]] claim 26, wherein a sheet-metal strip which is wound onto two rollers and held tensioned is provided as a diaphragm store, said sheet-metal strip having a plurality of, in particular, various diaphragm openings of fixed shapes, and it being possible by rotating said rollers to adjust said diaphragm setting by varying the diaphragm openings.

47. (Withdrawn-Currently Amended) [Optical] An optical imaging device according to [[Claim]] claim 46, wherein the tension of said sheet-metal strip, and the height of said diaphragm opening, are kept constant by at least two additional guide rollers, which cause a resilient pretensioning, the first roller being arranged in a fixed fashion, and the second being supported flexibly in the spacing direction.

48. (Withdrawn-Currently Amended) [Optical] An optical imaging device according to [[Claim]] claim 46, wherein the position of said diaphragm openings can be determined by markings, in particular by cut-outs, at the edge of said sheet-metal strip.

49. (Canceled).

50. (Previously Amended) A diaphragm device for stopping down an objective of the type used for carrying out semiconductor microlithography with a beam of extreme ultra-violet light directed along a beam path, said diaphragm device comprising:

a plurality of diaphragms each of which has a respective diaphragm opening of a fixed geometry, said fixed geometry of said diaphragm openings being different in different respective ones of said diaphragms;

a diaphragm store for storing said diaphragms such that said diaphragm openings of said diaphragms present in said diaphragm store are not in the beam path, and a diaphragm exchange mechanism for selectively exchanging said diaphragms between said diaphragm store and an operating position in the objective, said operating position being a position wherein the said diaphragm opening of a said diaphragm present in said operating position is located in the beam path, whereby the objective can be selectively stopped down according to the said fixed geometry of the said diaphragm opening of whichever one of said diaphragms from said diaphragm store is selectively introduced into said operating position .

51. (Canceled).

52. (Canceled).

53. (Currently Amended) [A diaphragm device for stopping down] An optical imaging device, in particular an objective of the type used for carrying out semiconductor microlithography [with a beam of] at an extreme ultra-violet [light directed along a beam path, said diaphragm] wavelength, said device comprising:

a plurality of optical elements disposed in a beam path for a beam of extreme ultra-violet light;

a diaphragm device [with an adjustable diaphragm opening shape, wherein the diaphragm device has] having a diaphragm store which [comprises a revolving disc diaphragm stack with] includes a plurality of individual [revolving disc] diaphragms

[which are provided with different diaphragm openings with fixed shapes in each case, which can be introduced into the beam path] each of said diaphragms having a fixed diaphragm opening, said fixed diaphragm opening being different in different respective ones of said diaphragms, and

a lifting device for positioning said [revolving disc] fixed diaphragm opening of a selected one of said diaphragms in the beam path.

54. (Currently Amended) [A diaphragm device for stopping down] an optical imaging device, in particular an objective [of the type used] for carrying out semiconductor microlithography [with a beam of] at an extreme ultra-violet [light directed along a beam path] wavelength, said [diaphragm] device comprising:

a plurality of optical elements arranged for directing a beam of light of extreme ultra-violet wavelength along a beam path to project an image of a mask onto a substrate; a plurality of diaphragms each of which has a diaphragm opening of a fixed shape, said fixed shape being different in different respective ones of said diaphragms, and

a diaphragm device [with an adjustable diaphragm opening shape, wherein the] diaphragm device has] having a diaphragm store [with a plurality of different diaphragm openings with fixed shapes in each case, which can be introduced into the beam path] for storing said diaphragms in a stack, and for introducing into the beam path the said diaphragm opening of said diaphragm from said stack.